UNIVERSITY OF CALIFORNIA.

AGRICULTURAL EXPERIMENT STATION.

BULLETIN NO. 45.

Grafting the California Wild Vine.

[In order to render the results of investigations and experiments conducted by the Agricultural Department of the University of California more quickly and more generally available than has heretofore been done through the annual or biennial reports, it is proposed to embody hereafter, in the form of "Bulletins," to be issued as often as may seem desirable, reports of results, as well as such other discussions, information or answers to questions as may be of general interest. It is intended to make these bulletins, as a rule, short enough for insertion in the daily or weekly papers of the State, and proof-slips of the same will be regularly mailed to papers applying therefor. The substance of these bulletins will ultimately be embodied in a more complete and connected form, in the annual reports of the College of Agriculture.]

The subjoined letter lately received from Mr. J. E. Packard, together with an excerpt from the *Pomona Progress*, is published as throwing light on some questions that have been prominently before the public of late, and regarding which a good many unfounded impressions prevail. It has been claimed that not only the resistance of the Californian and other wild American stocks to the phylloxera has not been well proven, but that no perfect union between the *vinifera* graft and the *Californica* stock is formed, and that the graft is liable to be blown over at any time; and finally that if successfully grafted, there is no proof that such grafts will bear, or that the grapes will correspond to the quality of the scion.

As to the latter point, it may well be claimed as an established fact that the scion determines, in all cases, the character of the fruit, when any is formed. To deny this is to deny a fundamental axiom in horticulture, which has been demonstrated myriads of times for thousands of years. Minor differences may, it is true, arise from the habits of growth of the stock as compared with those of the graft when on its own root, whether as to rapidity of development, nourishment drawn from the soil, adaptation to climate, etc. In this respect the vine does not differ from other fruits, for which the best stock has to be ascertained by trial in each region.

As to the bearing of fruit, it is well known that under certain circumstances of soil and climate it may be greatly retarded, or even suppressed. But the grafts made on the University grounds on *Californica* stocks have all borne abundantly and early; and apart from many other examples of the same kind, Mr. Packard's experience in his 100-acre grafted vineyard, *three years from the seed*, is a living example, than which a stronger cannot readily be found for other vines.

As to the success of the grafts *when properly made*, Mr. Packard's showing of 98 per cent of successes cannot be easily excelled by grafts made on other stocks. As to the strength of the union, our experience here has been that when well made the junction becomes imperceptible, and as strong as any other part of the vine.

It is true that when a strong grower is grafted upon a weak one, there may be difficulty on account of the weak base of a stouter trunk. But in the reverse case there is no trouble, for a relatively stout base for a weak trunk is desirable. The strong-growing Californica will, in its own home, furnish just such a stock for all or almost all the *vinifera* varieties, which it exceeds in growth whenever planted in appropriate soils.

The latter point is one the inattention to which will doubtless explain a great many reported failures. The California vine is a rank feeder, and will not do well on poor or shallow soils. It has, to my personal knowledge, been planted on some lands on which it could hardly be expected to live in the absence of the phylloxera; and with a little help from the latter, it has of course proved "non-resistant." It is not claimed by *anyone* that the *Californica* or any other vine cannot be killed by the phylloxera under such unfavorable circumstances. There is a limit beyond which the addition of even a straw may break the camel's back.

A more extended discussion of this subject will be given hereafter; in the meantime it is greatly to be desired that all experience had in this matter be brought to light for critical consideration.

Berkeley, Oct. 9, 1885. E. W. HILGARD.

Remarkable Growth of Vines.

Scarcely more than two years ago Mr. Packard purchased, in different locations, two tracts of land of 170 and 86 acres, and immediately

began the improvement of the same. The tract of land consisting of 170 acres is situated four miles northwest of Pomona, on the San Bernardino road, and is of the very richest soil. Planting the main body of the place to vines, the wild or native California grape was secured, and this year grafted to Zinfandel, Burger and Mataro varieties. The growth made by the vines on this place is simply astonishing, as no water whatever was used, and it is safe to assert that 98 per cent of the grafted vines are growing to-day, where, if cuttings had been planted scarcely one-half would have lived. In many cases, by actual measurement, the canes are ten feet in length, and bunches of grapes weighing three and a half pounds each have been picked from this vineyard. From 80 acres about 25 tons of grapes will be realized this season, and when it is taken into consideration that these vines have received no water whatever, their condition proves conclusively that, in the right soil, fruit can be produced without irrigation. This soil is no exception; as there are many hundreds of acres of land in the Pomona valley that likewise need no irrigation whatever.—*Pomona Progress, August 20, 1885.*

Mr. Packard's Letter.

Prof. E. W. Hilgard, Berkeley, Cal.—Dear Sir: In response to your request I now send to you a copy of the *Pomona Progress*, giving a description of the appearance of my Californica vineyard. I will also make a brief memoranda of the details of my method of grafting them. I will here state that I grafted, last spring, about seventy-five thousand, and have now a percentage of loss of about two per cent of that number.

First, the vines were cut off to within three or four inches of the ground, and the brush hauled away; second, the land was plowed, the soil being thrown from the vines; third, grafting commenced February 10th, about three weeks before the vines started. For grafting I worked my men in sets of about thirteen, as follows: One man to shovel dirt from the vine; one man to saw vine at the surface, or one inch below the surface of the ground; three grafters—regular hands who had never put in a graft until they commenced this job; one man following to wax the union who used a brush and wax pot; and finally, seven men to shovel the dirt to the vine, covering the graft to the top bud. All workmen, excepting the grafters, were Chinamen. Each gang grafted eighteen hundred to two thousand per day. Varieties grafted: Burger, Zinfandel, Mataro and Golden Chasselas. All have made a magnificent growth. Commencing grafting February 18th, I substantially finished three weeks after that date—having something like ten thousand remaining, which were finished up by two or three men by April 1st, when the vines were in leaf. I can see no material difference either in percentage of loss or in growth between the early and the late grafted. The method used was a cleft graft for the larger vines—say all larger than your little finger. For the smaller ones a tongue graft was used, and a great many were grafted which were not larger than a lead-pencil. I find that the latter are doing as well as any of the larger ones. As a matter of experiment, one of my men cut the top of a vine off below a point where the roots branched out, and inserted four Mataro grafts in as many small roots. These four grafts are growing now, thus proving that it is unnecessary to graft in the crown.

I will mention the after work when the grafting was finished. The field looked like a multitude of anthills at that time, on account of the dirt thrown up to the scion. I then plowed the land crosswise, throwing the dirt to the vine. Then, as soon as the union of scion and vine was strong enough, I cut the vine away, leaving one standard only, which I tied up. The "ant-hills" were leveled down, exposing the roots on the scion, which were cut off; and, as the union is at the surface, they cannot form anew and the vine must be supported by the Californica root alone. The misses which I have, I find to be almost invariably due to the fact that the scion was set with its sap veins entirely outside of that in the root, and as a matter of course, such failed to grow. I used a great many lateral cuttings with an abundance of pith; they all grew, however.

Of course, I used a great deal of care in keeping my scions in the best possible condition; they were never allowed to get into a position where they would dry out or injure in any other way. If there are any other points in regard to this matter which you desire to know, I will furnish them to you with pleasure.

Pomona, Oct. 2, 1885. JOHN E. PACKARD.